

CLAIMS

What is claimed is:

- 1 1. A device for simulating slip of a wheel on a vehicle test bench according to the
2 equation $F_R = F_A \times C$, wherein F_R is a frictional force, F_A is a contact force of the wheel,
3 and C is a coefficient of friction, the device comprising:
 - 4 a movable test surface to simulate rolling conditions of a wheel which contacts
5 said test surface with a contact force F_A ; and
 - 6 means for changing the contact force F_A in a predetermined manner.
- 1 2. The device for simulating slip of claim 1, wherein the means for altering the
2 contact force F_A comprises a lifting/lowering device.
- 1 3. The device for simulating slippage of a wheel in a vehicle test bench of claim
2 2, wherein the lifting/lowering device can vertically adjust a hub of the wheel while the
3 wheel is rotating.
- 1 4. The device for simulating slip of claim 2, wherein the lifting/lowering device
2 holds the wheel with a holding force and is controllable by one of hydraulic pressure,
3 electrical signals, and linear motors, the device for simulating slip further comprising
4 means for measuring the holding force, whereby the holding force can be used to
5 determine the contact force.
- 1 5. The device for simulating slip of claim 2, wherein the lifting/lowering device
2 can follow a tracking/steering angle and a kingpin angle of the wheel, whereby the

3 lifting/lowering device can secure the wheel in a direction transverse to the direction of
4 travel.

1 6. The device for simulating slip of claim 2 further comprising:
2 a wheel adapter for coupling the wheel to the lifting/lowering device,
3 a bearing unit rotatable about a pivot axis so as to change the track of the
4 wheel, the wheel adapter being rotatably arranged in the bearing unit;
5 a mount pivotably mounted to joint blocks;
6 a plurality of connecting arms connecting the bearing unit to the mount;
7 linear drives for lifting and lowering in the joint blocks in linear guides in a
8 predetermined way;
9 a supporting block on which the linear guides and the linear drives are
10 arranged; and
11 a base plate for attaching the supporting block to an underlying surface.

1 7. The device for simulating slip of claim 1 further comprising means for
2 changing the coefficient of friction.

1 8. The device for simulating slip of claim 7, wherein the means for changing the
2 coefficient of friction comprise a nozzle for introducing water between the wheel and the
3 surface of the test device.

1 9. The device for simulating slip of claim 2, further comprising a controller for
2 controlling the lifting/lowering device, the controller being integrated into a controller of
3 the vehicle test bench.

1 10. The device for simulating slip of claim 2 further comprising a plurality of
2 lifting/lowering devices for respective wheels, and a controller for connecting the
3 lifting/lowering devices.

1 11. A method of simulating slip of a wheel on a vehicle test bench comprising a
2 movable test surface for simulating rolling conditions of a wheel which contacts said
3 surface with a contact force F_A , said method comprising displacing the contact force F_A
4 from the wheel to a lifting device in a predetermined way by lifting the wheel off the
5 surface as the wheel rotates.

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1 12. The method of simulating slip of claim 11 comprising:
2 completely displacing the contact force F_A from the surface to said lifting device
3 by lifting the wheel completely off the surface;
4 determining the absolute value of the contact force F_A by means of a measuring
5 device while said wheel is completely off said surface;
6 determining a maximum traction force F_Z which can be transmitted to the surface
7 based on said absolute value;
8 calculating a coefficient of friction C with the equation $F_Z = F_A \times C$, where F_A is
9 the absolute value; and

10 setting the friction force F_R according to the equation $F_R = F_A \times C$ by controlling
11 the contact force F_A .

1 13. The method of simulating slip of claim 12 wherein said maximum tractive
2 force F_Z is changed in accordance with a predefined test program.

1 14. The method of simulating slip of claim 12 wherein said coefficient of friction
2 is changed in accordance with a predefined test program.